N° 8036 A.D. 1889

Date of Application, 14th May, 1889
Complete Specification Left, 13th Feb., 1890—Accepted, 15th Mar., 1890

PROVISIONAL SPECIFICATION.

An Apparatus to be used by Opticians for Testing Defective Vision.

I, Julia Lawrence, of 20 Tyndale Place, Upper Street, Islington, in the County of Middlesex, Clerk, do hereby declare the nature of this invention, a communication to me from abroad by Sydney Lawrence, of 4 Hare Street, Calcutta, India, Ophthalmic Optician, to be as follows :—

The invention has for its object an apparatus to be used by opticians for testing defective vision with accuracy by day or by night.

The invention consists of a number of known appliances confined in a special and ingenious manner, whereby accuracy and facility in the testing of defective vision are secured. The invention consists essentially of an adjustable chair, electric or other light, and adjustable type stand to be used therewith. The chair, which may be constructed of wood or other suitable material, is in two parts ; the upper part or seat revolves freely and with perfect smoothness and steadiness, preferably by means of a pivot and four castors, which are concealed from view, and which run in a groove let into a plate fixed in the lower frame-work or legs of the chair ; the legs of the chair are terminated by brass or other wheels, which rest on the horizontal rail hereafter described.

A foot rest, adjusted to the upper portion of the chair, completes this part of the combination for which protection is sought. Two steel or other rails, laid flush with the floor, bear the chair as above described, the pedal castors resting and running on the rails, and thereby admitting of the chair being smoothly and steadily moved to any required distance from the type stand, while the revolving seat admits of the patient being placed to any distance from, and at any angle to, the source of light. To ensure accuracy and facilitate the determination of distances, brass or other figures are fitted flush into the floor and parallel to the rails aforesaid, say, at distances of one foot apart from one to twenty feet, an inner series of such numbers denoting the number of feet, and an outer series of numbers from one to six, denoting the number of metres measured accurately from the type stand. At each end of the rails, and perpendicular to them, two polished wooden stands are placed, which have adjustable frames fitted to them, which frames can be raised and lowered to the required height, by means of pulleys ; such adjustable frames have skeleton frames attached to them to admit of one set of types being removed and replaced by another without loss of time. Attached to each or either stand are wooden or other trays on hinges, to hold a case of trial lenses, and a rod or measure, which is marked off, say, in inches, from one to twenty four, and to which a frame fixed to an arm is attached, whereby a card of types can be adjusted to any required distance from the patient, or any required height above the ground. By this contrivance, the type cards are kept on a true level with the patient's eyes. Subsidary to these contrivances, is an electric lamp with a highly polished reflector, so as to throw a brilliant light from behind the patient on to the types, and thus to enable an ophthalmic optician or an oculist to test sight at night a desideratum in the case of invalids and others who may not be able to expose themselves by day.

The special novelty claimed consists in the combination of parts described above, whereby in eye infirmaries, hospitals, and other places, a large number of cases of errors of refraction can be rapidly, conveniently and accurately tested.

Dated this 14th day of May 1889.

JULIA LAWRENCE.
By Harris & Mills,
23, Southampton Buildings, London, Agents.

[*Price 8d.*]

COMPLETE SPECIFICATION.

An Apparatus to be used by Opticians for Testing Defective Vision.

I, Julia Lawrence, of 20 Tyndale Place, Upper Street, Islington, in the County of Middlesex, Clerk, do hereby declare the nature of this invention, a communication to me from abroad by Sydney Lawrence, of 4 Hare Street, Calcutta, India, Ophthalmic Optician, and in what manner the same is to be performed, to be particularly described and ascertained, in and by the following statement, reference being had to the accompanying drawings, and to the figures and letters marked thereon:—

The invention has for its object an apparatus to be used by opticians for testing defective vision with accuracy by day or by night.

The invention consists of a number of known appliances combined in a special and ingenious manner, whereby accuracy and facility in the testing of defective vision are secured. The invention consists essentially of an adjustable chair, electric or other light, and adjustable type stand to be used therewith. The chair, which may be constructed of wood or other suitable material, is in two parts; the upper part or seat revolves freely and with perfect smoothness and steadiness, preferably by means of a pivot and four castors, which are concealed from view, and which run in a groove let into a plate fixed in the lower frame-work or legs of the chair; the legs of the chair are terminated by brass or other wheels, which rest on the horizontal rail hereafter described.

A foot rest adjusted to the upper portion of the chair, completes this part of the combination for which protection is sought. Two steel or other rails laid flush with the floor bear the chair as above described, the pedal castors resting and running on the rails, and thereby admitting of the chair being smoothly and steadily moved to any required distance from the type stand, while the revolving seat admits of the patient being placed to any distance from and at any angle to the source of light. To ensure accuracy and facilitate the determination of distances, brass or other figures are fitted flush into the floor and parallel to the rails aforesaid, say, at distances of one foot apart from one to twenty feet, an inner series of such numbers denoting the number of feet, and an outer series of numbers from one to six, denoting the number of metres measured accurately from the type stand. At each end of the rails, and perpendicular to them, two polished wooden stands are placed, which have adjustable frames fitted to them, which frames can be raised and lowered to the required height by means of pulleys; such adjustable frames have skeleton frames attached to them, to admit of one set of types being removed and replaced by another without loss of time. Attached to each or either stand are wooden or other trays on hinges to hold a case of trial lenses and a rod or measure, which is marked off, say, in inches, from one to twenty four, and to which a frame fixed to an arm is attached, whereby a card of types can be adjusted to any required distance from the patient or any required height above the ground; by this contrivance, the type cards are kept on a true level with the patient's eyes. Subsidiary to these contrivances is an electric lamp with a highly polished reflector, so as to throw a brilliant light from behind the patient on to the types, and thus to enable an ophthalmic optician or an oculist to test sight at night, a desideratum in the case of invalids and others who may not be able to expose themselves by day.

Figure 1 is an elevation and Figure 2 is a plan representing my combined arrangement of apparatus. Figures 3 and 4 are elevations of one of the type stands separately, Figure 5 is an elevation of a stand or post adjustably carrying a lamp or light, Figure 6 is an elevation of a portable box or stand for holding type boards, and Figure 7 is an elevation of the back of the chair, with the measure and other parts folded against the back thereof.

In carrying my invention into effect I construct one or more wooden upright frames or stands A of suitable dimensions, I have found about 4½ feet broad, 4 inches deep, and

6 feet high, to be most convenient. The upper exposed or front portion of each stand has affixed to it, three skeleton frames or grooves, made preferably of wood, all being of the same calibre or size ; on the lower portion of each skeleton frame is a binding screw, clip or nut B. The skeleton frames with the nuts or clips are constructed for the purpose of adjusting and firmly securing, in a perpendicular position, any type board in any character required for the time being for testing defective vision. Within the lower portion of the upright frame or stand and concealed from view, is another wooden frame C, see figures 1 and 4, on which is fixed a Carter's or other clock face, a half circle of lines, and two complete circles of lines in two colors, or other tests for astigmatic vision. The said frame C slides in grooves formed on both sides of the wooden upright frame or stand A. Attached to both sides of the inner frame is a chain or rope D, running over brass or other wheels at E fixed to the side of the upper portion of the stand A. At the end of each chain or rope, weights or pulleys F are attached, the weights or pulleys, being within each side of the frame or stand, are concealed from view. The combined weight of the two weights or pulleys is heavier than the weight of the wooden frame they are attached to, and therefore a brass or other binding screw, nut or catch G is attached to the centre of the outer side of the stand A to keep the frame C down and within the lower body of the stand. By turning this binding screw, nut or catch away from the frame A, it releases the resistance, and the frame C at once slides up to view and covers that portion of the stand on which are held the type boards, A B, C D, E F. To the upper and exposed sides of the stand are fixed two pads H made of thick rubber, both ends of which are enclosed within two layers of wood. The object of the said rubber pads is to break the run of the frame C before it reaches the top of the stand and to deaden the noise when it reaches its proper height. At each side of the stand A I place a brass or other bracket *a* for the purpose of securing a case of trial lenses or trial frame.

At the side of the stand or frame A, is placed an iron post II figure 5 about 6 feet high and 1½ inches square, to which is attached a handle III with brass or other bracket or arm *b*, formed in three or other number of pieces joined together by pivots or pins. At the end of this bracket or arm is a brass clip or catch, for the purpose of securing a lamp or light, which is enclosed in a triangular shaped wooden frame *c*, the two sides being attached to the intermediate part by hinges. Fixed to this frame *c* are mirrors, which reflect the light from the lamp or light on to the type board or boards or the frame which may have to be illuminated. The arm or bracket can be raised to any required height by turning the handle III, which raises the arm *b* along the teeth or rack formed on or fixed to the iron post II. I also employ a chair K constructed in two parts, and preferably of wood and covered with leather. The four legs terminate with brass wheels or castors *d*, which run on rails *e*, *e*, hereafter described. The upper portion L of the chair or seat revolves round, and upon the lower portion, by means of a pivot or screw at M fitting into a socket in the centre of the seat, and on four small metal wheels (not shown) fixed in a circle, which run in and round an inlaid metal groove, laid into the wood of the lower portion of the chair, as will be well understood. To the upper portion of the chair, and in front of it is affixed at an angle, a wooden leg rest N reaching to within about one inch from the ground. At the back of the upper portion of the chair, I affix by means of two brass clips IIII an adjustable measure O graduated from 1 to 24 inches, capable of resting by means of hinges and a bracket *f* in a horizontal position, on a round or square upright or leg of wood or other material about 4½ feet high and 1 inch in circumference or 1 inch square, which is held against the back of the chair and fastened to it when required by the brass clips IIII, which are locked together by moveable screws, nuts, or turn buttons. Adjoining the centre or side of the measure O is a frame-work P, preferably of wood, placed in a vertical position ; the frame is about 22 inches long and about 1 inch wide. Resting against this frame is another piece of wood Q, about 10 inches long and 1 inch wide, with a projecting ledge at both ends in which to slide a card of test type. A small knob or handle R is fixed in the centre of this piece of wood, thus enabling the card of types resting on it to be raised in the groove of the frame to the height of the patient's eyes and secured in this position by tightening the nut or handle R. The vertical arm holding the type card runs along the inner centre portion of the measure O, and can be kept at any distance, from 1 to 24 inches, from the patient's eyes. The measure with all its parts, when not required for testing near vision, can be closed together at the back of the chair, as shown in figure 7, and the entire apparatus, open or closed, can be revolved in any direction by the slightest touch, or entirely removed from the chair by simply turning the brass handles, screws, nuts, or clips, at the back. Adjoining this measure, and also joined at the back of the upper portion of the chair, and projecting about one foot forward from it, is a brass head rest T, consisting of a brass curved shaped rod *g*, from which hangs in a vertical position, by means of hinges, a thin brass pipe, about one quarter of an inch in diameter ; running through this pipe is a solid brass rod, about 20 inches high and terminated by a small brass band U about 3 inches long and 1 inch broad. This band, which acts as a head rest, can be raised to the height of the patient's forehead, which rests against it, as the rod to which the head rest is attached readily slides through the brass pipe above described. Attached to the same rod which holds the head rest, and made to slide on it, is a skeleton spectacle frame V (to hold trial glasses) made of nickel or other metal, the eye pieces moving on an adjustable screw running through the horizontal bar of the frame. By rotating the screw at either end, the eye pieces holding the trial glasses can be brought nearer to or further from one another to suit any width of face. If the skeleton spectacle frame is not required for the time being, it can be removed from the line of vision by sliding it along the pipe of the head rest and on a level with the measure.

I also employ as part of my apparatus, a type cabinet W, figure 6, made preferably of wood, for holding type boards of equal size, having type painted or otherwise marked thereon in various characters. This cabinet has a suitable number of open partitions on each side. I use one preferably with twelve partitions. The bottom of the cabinet being constructed on a slant, any type board required can be seen at a glance and removed for the purpose of being placed in any of the three skeleton frames in the type stand A.

I lay two solid steel rails, each about twenty one feet long and about one inch broad and about 13 inches apart, in and flush with the floor. The legs of the chair K rests and run on these rails, the brass wheels fitting into the rails and enabling the chair to be propelled with ease.

Parallel with these rails and on one side of them, I lay at distances of a foot apart and flush with the flooring, figures, preferably of brass, from 1 to 20, figure 1 being one foot away from the type stand A, and so on through the series ; I also lay into the flooring a series of figures of smaller size from one to six, these figures denoting the number of metres, the figure number 1 being placed one metre away from the type stand A, and so on through the series on the metre scale.

I would here remark that I do not limit myself to the precise arrangement of apparatuses and parts, nor yet to the precise dimensions and measurements hereinbefore described with reference to the accompanying drawings, as these may be variously modified without departing from the nature of this invention.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is :—

1. The combination of parts and adjustments hereinbefore described, whereby in eye infirmaries or hospitals, a large number of cases of errors of refraction can be rapidly, conveniently, and accurately tested.

2. The combination of appliances, apparatuses, and parts, for rapidly and accurately guaging the extent of vision and the exact distances at which types can be seen, without subjecting the patient to the exertion of standing, and which is therefore admirably adapted to the case of young, aged, or infirm patients.

3. The skeleton frames and other appliances and adjustments involved in the construction of the type stands, whereby one set of types can be instantaneously

replaced by another, a desideratum for India where so many different characters and types are employed.

4. The combination of apparatuses, adjustments, and parts, whereby in testing for near sightedness, the types are securely adjusted, without the patient being required to hold them, at any required distance from his eyes, and on a level with them.

5. The combination of apparatuses, adjustments, and parts which facilitate the placing of a patient at any required distance from, and at any required angle with reference to, the source of light.

6. The combination of apparatuses, adjustments, and parts which facilitate the testing of the eyes in cases of astigmatism, whereby the astigmatic types and lines, by being attached to the frame C of type stands, are kept out of sight until the moment they are actually required.

7. The combination of apparatuses, adjustments, and parts, by which the patient's head is kept in one position and spot, thus enabling the distance at which the types are read when testing near vision to be guaged with perfect accuracy.

8. The combination of apparatuses and parts by which the trial lenses are adjusted to a skeleton frame, thereby enabling the lenses to be kept steadily at the proper distance from the eye without any effort on the part of the patient, or requiring him to wear the trial frame on the face.

9. The combination of apparatuses and parts for holding the lamp and mirrors, whereby any type stand, or any portion of a type stand can be illuminated, the types not required being kept in the shade.

Dated this 13th day of February 1890.

JULIA LAWRENCE.
By Harris & Mills,
23, Southampton Buildings, London, Agents.

London : Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1890.

WELLCOME LIBRARY INSTITUTE

A.D. 1889. May 14. Nº 8036.

LAWRENCE'S Complete Specification.

(2 SHEETS)
SHEET 1

FIG. 1

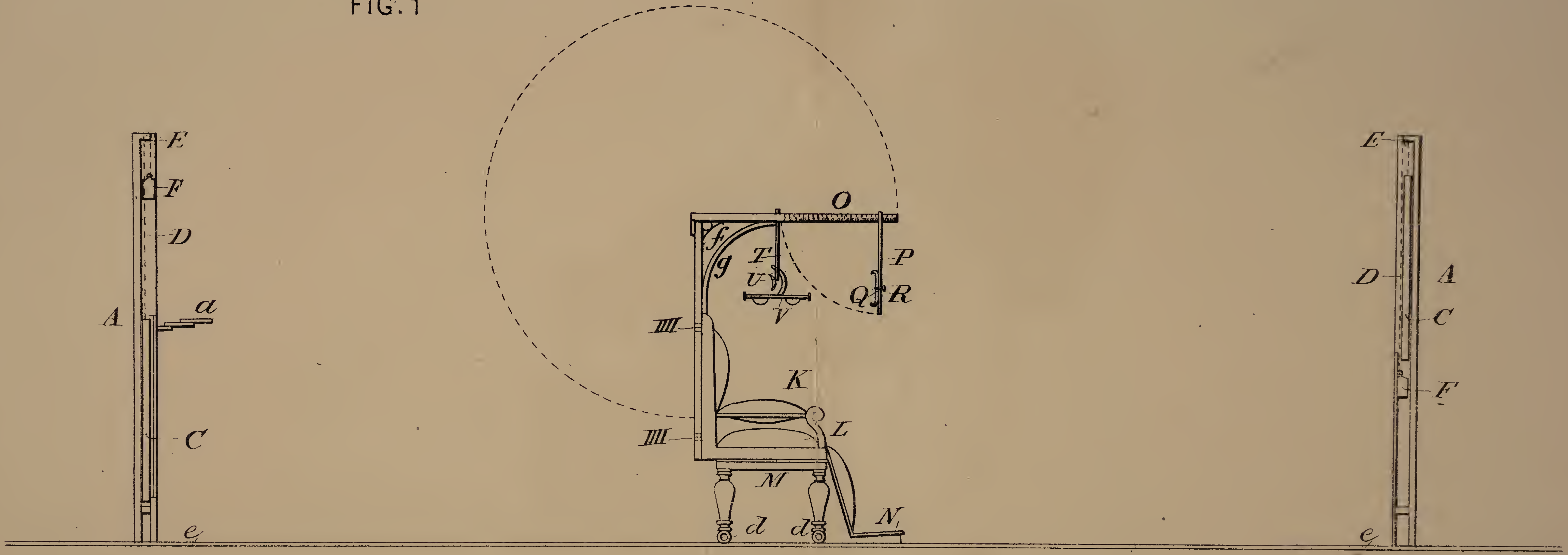


FIG. 3

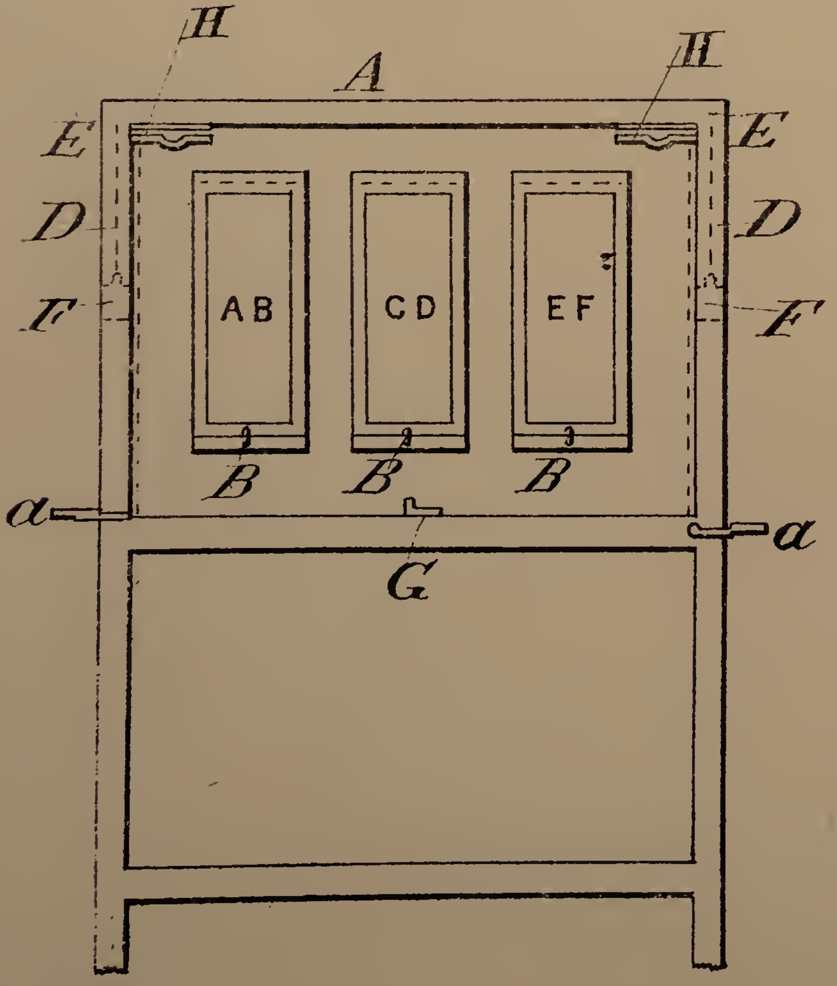


FIG. 4

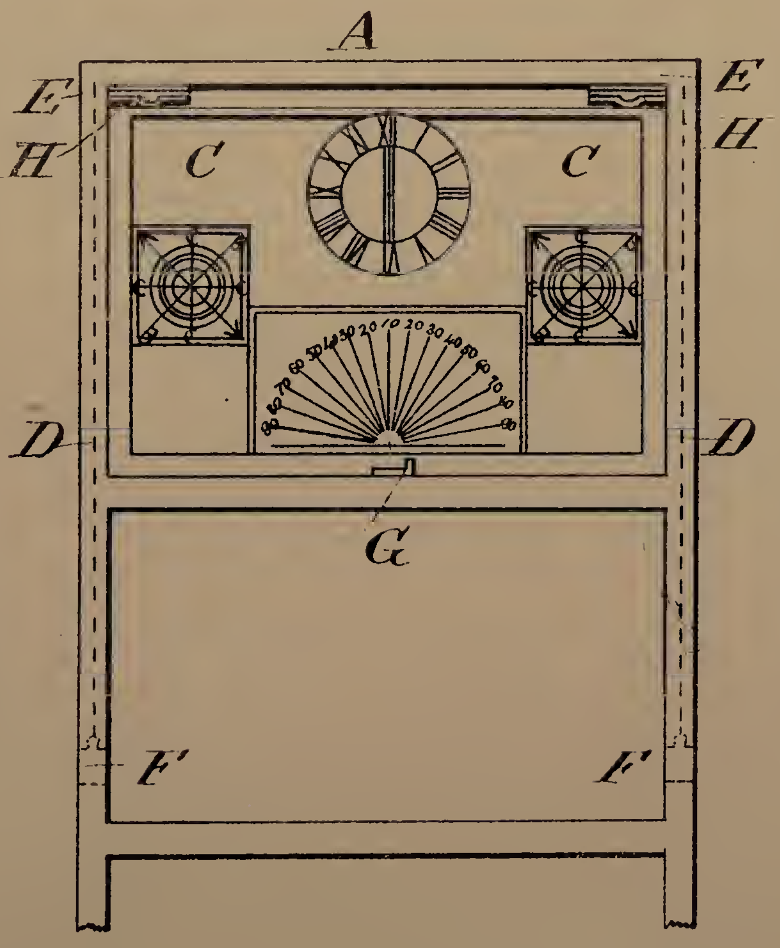


FIG. 5

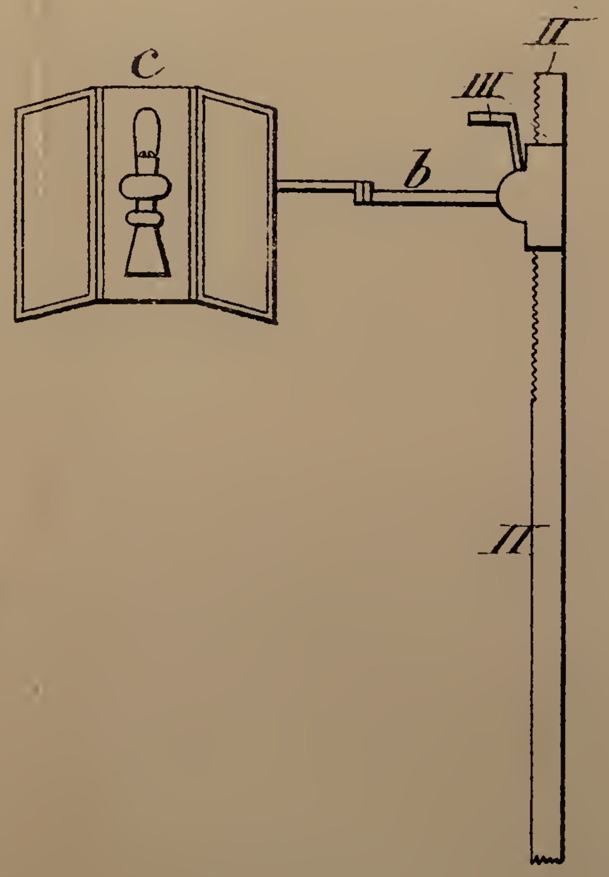


FIG. 6

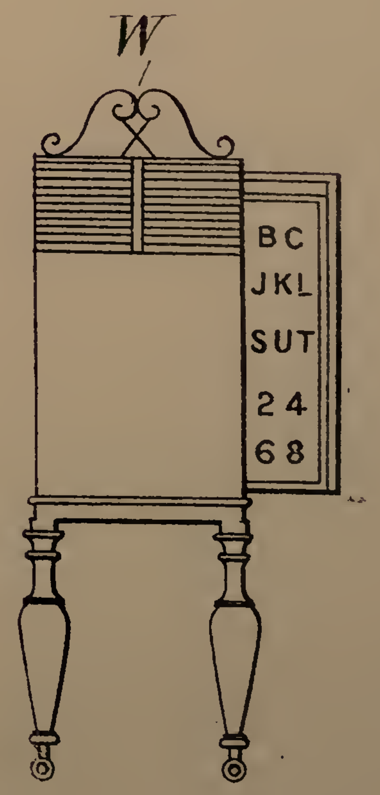
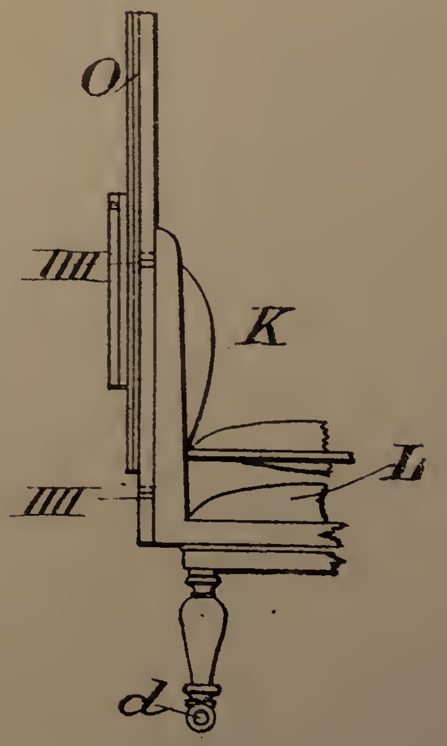


FIG. 7

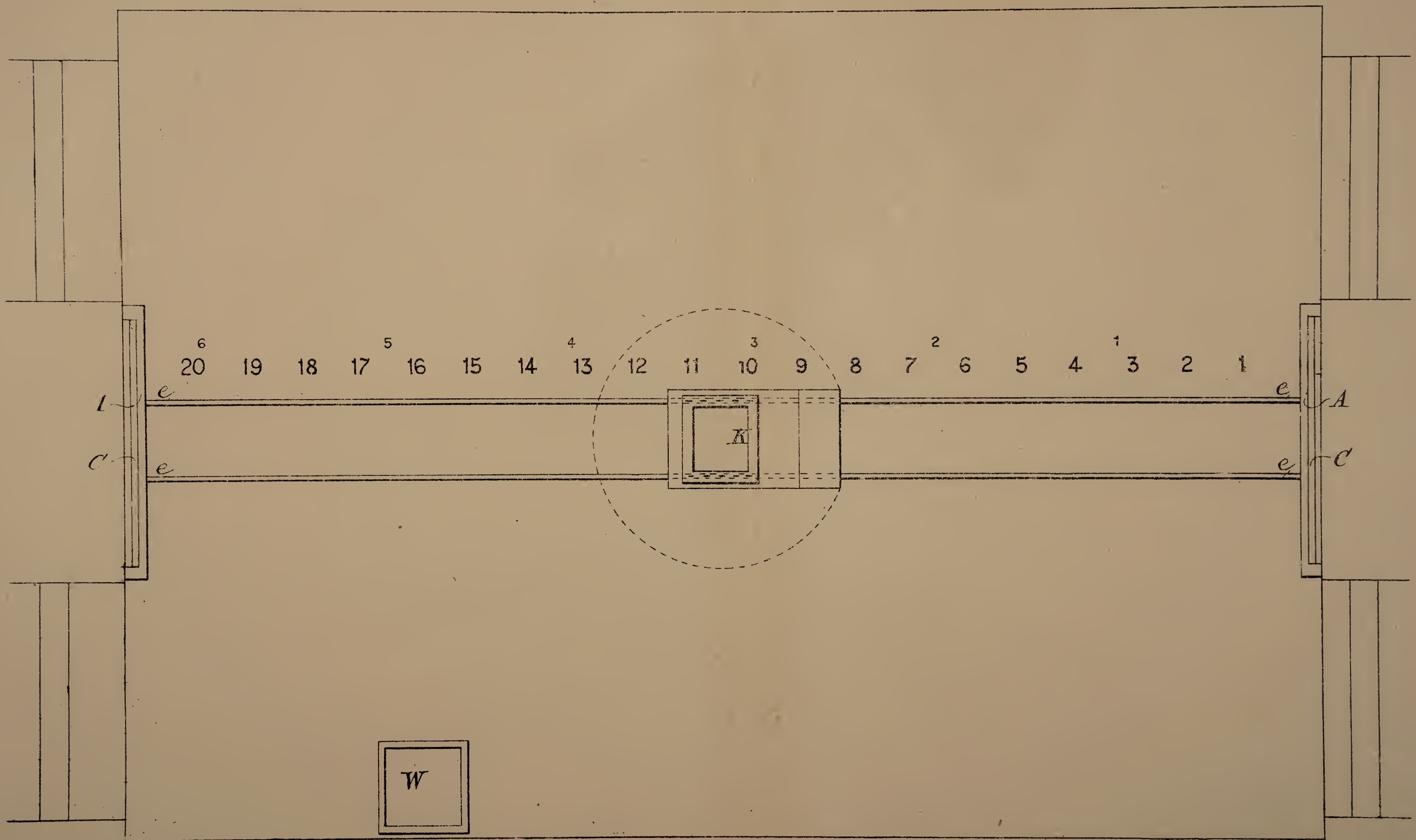


[This Drawing is a reproduction of the Original on a reduced scale.]

London.—Printed by Darling and Son Ld.
for Her Majesty's Stationery Office. 1890.

Malby & Sons, Photo-Litho.

FIG. 2



[This Drawing is a reproduction of the Original on a reduced scale]

London. Printed by Darling and Son Ld
for Her Majesty's Stationery Office. 1890.

Malby & Sons, Photo-Litho